130. Proposed by B. F. FINKEL, A. M., M. Sc., Professor of Mathematics and Physics, Drury College, Springfield, Mo.

If the points x, y, z divide the strokes c—b, a—c, b—a, in the same ratio r, and the triangles x, y, z and a, b, c are similar, either $r=1$ or both triangles are equilateral. [From Harkness and Morley's *Introduction to the Theory of Functions*, page 26.]

*** Solutions of these problems should be sent to B. F. Finkel not later than Dec. 10.

CALCULUS.

99. Proposed by L. C. WALKER, Associate Professor of Mathematics, Leland Stanford Jr. University, Palo Alto, Cal.

The axis of three equal right circular cylinders intersect at right angles. Find the volume of the solid common to all.

100. Proposed by B. F. FINKEL, A. M., M. Sc., Professor of Mathematics and Physics, Drury College, Springfield, Mo.

What is the volume bounded by the surface generated by the circumference of a circle whose diameter is the hypotenuse of a right-angled triangle whose base is b and altitude a, the plane of the circle being perpendicular to the plane of the triangle, the triangle and circle being rigidly connected, and the triangle revolving about its altitude a as an axis?

101. Proposed by WILLIAM FRED FLEMMING, Denison, Tex.

A 24-inch joint of 6-inch stove pipe is compressed at one end to make it fit over an elliptical opening in a stove (for the escape of the smoke). The ellipse has a major axis of 8 inches. What reduction is there in the solid contents of the stove pipe, assuming that its compressed shape may be generated by a 6-inch circle which passes uniformly from one end to the other and perpendicular to the axis of the pipe?

*** Solutions of these problems should be sent to J. M. Colaw not later than Dec. 10.

MECHANICS.

99. Proposed by G. B. M. ZERR. A. M., Ph. D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

In a triangle ABC, base$=b$, area$=\triangle$, the principal moments of inertia at the centroid are $\frac{1}{72}m[a^2+b^2+c^2 \pm \sqrt{(a^4+b^4+c^4-a^2b^2-a^2c^2-b^2c^2)}]$ and the principal axes at this point make with the base AC an angle θ given by

$$\tan 2\theta = \frac{4(c^2-a^2)\triangle}{(a^2-c^2)^2-b^2(a^2+c^2)+2b^4}.$$

100. Proposed by WALTER H. DRANE, Graduate Student, Harvard University, Cambridge, Mass.

A man, riding a bicycle, runs through a puddle of water and a bit of mud is thrown from the rear wheel and alights on the crown of his hat. Supposing the wheel 28 inches in diameter, that the man's head is 6 feet above ground, that the saddle is one foot in front of the rear wheel, and that the mud left the wheel at a point 30° from highest point of wheel, how long will it take a man to ride a mile at this rate?

*** Solutions of these problems should be sent to B. F. Finkel not later than Dec. 10.